FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED RAIL AUTHORITY

Briefing Packet

for the

Implementation Plan

Industry Workshop

San Diego, CA

February 23, 2005

CALIFORNIA HIGH SPEED RAIL AUTHORITY

Industry Workshop Agenda
February 23, 2005
San Diego, CA

I. Welcome/Introductions

II. Background – Where We Are Today

III. Overview of the DRAFT Implementation Plan

IV. Detailed Discussion

   a. Institutional Structure

   b. Procurement Strategy

   c. Technology Selection

   d. Phasing and Staging Methodologies

   e. Financing

V. Closing

California High-Speed Rail Authority
Implementation Plan Industry Workshop
San Diego, CA
February 23, 2005

List of Attendees

(as of February 11, 2005)

Joseph Petrillo
Chair
California High Speed Rail Authority

Marc Adelman
Vice-Chair
California High Speed Rail Authority

Donna Andrews
Vice-Chair
California High Speed Rail Authority

Frances Florez
Vice-Chair
California High Speed Rail Authority

Rod Diridon
Board Member
California High Speed Rail Authority

Robert Giroux
Board Member
California High Speed Rail Authority

Lynn Schenk
Board Member
California High Speed Rail Authority

T.J. Stapleton
Board Member
California High Speed Rail Authority

Mehdi Morshed
Executive Director
California High Speed Rail Authority

Dan Leavitt
Deputy Director
California High Speed Rail Authority

Carrie Pourvahidi
Deputy Director
California High Speed Rail Authority

David Valenstein
Environmental Program Manager
Federal Railroad Administration

Andrew Antwih
Chief Consultant
Assembly Transportation Committee

Dana Curry
Director, Transportation
Legislative Analyst's Office

Will Kempton
Director
Department of Transportation

Steve Schnaidt
Staff Director
Senate Transportation and Housing Committee

John Bonilla
Business Manager
Operating Engineers – Local 3

Miguel Contreras
Vice President
California Labor Federation

Stan Feinsod
Vice President Rail Development
CONNEX

David S. Gedney
President
Fluor Daniel, Inc.

Darryl Goodson
Western Manager
Granite Construction, Inc.

California High-Speed Rail Authority
Implementation Plan Industry Workshop
San Diego, CA
February 23, 2005

List of Attendees

(as of February 11, 2005)

Mr. Kato
The Japanese California High Speed Rail Study Group c/o Sumitomo Corporation of America

Allen Will
Director of Business Development
United Airlines

Raymond Lanman
Vice President Corporate Development
Herzog Transit Services, Inc.

Jerry Wilmoth
General Manager
Union Pacific Railroad

Mr. Nehashi
The Japanese California High Speed Rail Study Group c/o Sumitomo Corporation of America

Walter Witt
The Japanese California High Speed Rail Study Group c/o Sumitomo Corporation of America

Don Phillips
Principal
ARUP

Albrecht Engel
President & CEO
SYSTRA Consulting, Inc.

Charlie Quandel
Vice President Railroad Division
HNTB Corporation

Nicholas Brand
Project Manager
SYSTRA Consulting, Inc.

Mr. Shiratori
The Japanese California High Speed Rail Study Group c/o Sumitomo Corporation of America

Jeffrey Brunetti
Vice President
Bechtel

Colin Stewart
Director
ARUP

Chris Dixon
Project Manager
Bechtel

Lecia Stewart
Vice President-High Speed Rail
Bombardier

Anthony Daniels
Senior Vice President
Parsons Brinckerhoff

Todd Welty
Director Business Development
Alstom International

Kip Field
Project Manager
Parsons Brinckerhoff

FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED RAIL AUTHORITY

Draft Implementation Plan

February 11, 2005

Draft Implementation Plan

I. Background

The California High-Speed Rail Authority (Authority) is the state agency authorized to develop and implement an intercity high-speed train system within California. The Governor and Legislature of California have granted the Authority all the powers necessary to oversee the construction and operation of a statewide high-speed train network once financing is secured. The Authority has circulated the Draft EIR/EIS to consider a proposed high-speed train system as a vital link in a statewide transportation system. As part of the next steps, the Authority is developing an Implementation Plan. This plan follows a series of technical and feasibility studies that began in 1993 to assess engineering, environmental and institutional constraints of various corridors and potential ridership between the major destinations connecting San Diego, Los Angeles, Bakersfield, the San Francisco Bay Area, and Sacramento.

The proposed statewide high-speed train system would be over 800 miles in length and would entail extensive engineering and construction, as well as operations and maintenance efforts. In the implementation phase of the program, it is imperative that the Authority address the phasing/staging of the statewide system, clearly understand the funding sources/mechanisms, establish procurement strategies, evaluate right-of-way preservation activities, initiate environmental clearance procedures, and investigate institutional issues.

II. Institutional Structure

The Authority, which is responsible for a large public infrastructure project, has broad legislative authorization to enter into contracts for the implementation of a high-speed train system; this includes contracts for the design, construction, operation and maintenance of the train system.

The Authority's objective is to identify an agency institutional structure containing agency staff with appropriate expertise, yet small enough to be flexible, innovative and efficient, while providing continuity, institutional stability and adequate oversight of private sector contractors. Those contractors would perform various services and would meet changing personnel needs during the different phases of implementation (planning and environmental review, design and engineering, procurement and construction, operation, maintenance and supply).

Among the options for consideration are three basic institutional models for building and operating the proposed HST:

1) *Large public agency* - the creation of a state high-speed rail organization in which most of the functions needed to design and operate the high-speed train system would be performed directly by agency employees in large rail construction and operations divisions (several hundred persons each), and competitively bid contracts would provide for the construction, maintenance and supply of the system.

2) *Small public agency with one or more private franchises* – A small, core public agency staff would administer a single large franchise under a long term (25-30 year) contract, in which the franchisee would carryout most of the tasks of implementing the system, or multiple franchises for different segments of the system

3) *Mid-size public agency staff - [hybrid approach]* - utilizing the strengths of both the public and private sectors. The public agency would be responsible for the policy, administration, contract oversight, security and program controls, while contracts with the private sector would provide for project management and would address detailed technical areas during the planning, design and engineering, construction, and operations phases of implementation.

Staffing for any of the options would require hiring new state employees. Certain expertise needed to oversee high speed train system implementation and to operate the system does not currently exist in state government, although the related expertise of other state agencies could be tapped for some functions. Personnel needs would vary during the implementation process (e.g., to support the construction period, several hundred staff would be needed for limited terms varying from two to 10 years), and current state personnel hiring processes are cumbersome and time consuming, and do not provide recruitment incentives to attract the specialized expertise needed to implement the proposed system.

While rail operations and maintenance functions will be ongoing, the capability to carry these functions out is widespread in the private sector. Competitive private sector bidding is increasingly used by California public transit agencies and for high-speed rail operations worldwide.

Compared to other transportation franchise projects, the California high-speed rail project is exponentially larger in both cost and geographical reach. Financing institutions have indicated that a franchisee would not be able to obtain completion bonding needed to ensure satisfactory completion of construction and operation of the system, because of the size of the project. Dividing the project into smaller independently sustainable franchises would still result in an initial phase larger than could be bonded.

Based on consideration of these three options, coupled with the complexities of the development of high-speed train system and the contracting abilities afforded the Authority, Authority staff find that neither the creation of a large public agency nor the use of a single franchisee is prudent, and recommends an institutional structure which relies upon an expert core public sector staff who utilize private sector expertise through competitive contracting to the greatest extent possible.

Under this approach the Authority structure would consist of a core public sector staff with multiple private sector contracts. Utilizing private sector contractors would best meet the majority of personnel needs for implementing the high-speed train system, allowing for competitive bidding and targeted recruitment to meet the ebbs and flows of expertise and labor resources needed to implement and operate the proposed system. A key private sector contract would provide for project management support.

The Authority would need to be able to manage a number of separate activities for different parts of the system simultaneously---planning, environmental review and permitting; design, real estate acquisition, negotiations with existing railroads and public entities; construction and testing; and, finally operation, maintenance and supply. The Authority's core staff would need to be expanded and the project management contractor/s would need to be brought on early in the implementation process.

The Authority's core staff would need to have strong capabilities in environmental permitting, contract management, procurement law, and finance in order to provide the appropriate level of oversight and to maintain the Authority's fiduciary responsibilities. Authority staff with technical expertise would also be needed to oversee contractors for specialties including: high-speed rail civil and structural engineering, architecture, train systems, construction management, operations and maintenance, travel forecasting, and marketing. Authority staff may also utilize independent technical experts to assist in evaluation of other contractors, including the program management contractor(s).

Initially the project management contractor/s, under the direction of Authority staff, would assist in the development of design criteria, preliminary designs, bid documents, project timeline and controls, and system integration. When the project enters the design and construction stage the project management contractor/s would provide oversight and coordination of the work being done by other contractors. The project management contract would likely be a multi-year contract and would require continued close coordination with and oversight by the Authority staff. Other private sector agreements would include numerous contracts for civil works design and construction, train systems design, procurement and installation, as well as operations, maintenance and supply contracts.

III. Procurement Strategy

The Authority's enabling legislation provides for the ability to enter into contracts with private or public entities for the design, construction and operation of high-speed trains, and allows for contracts to be separated into individual tasks or segments, including design-build or design-build-operate contracts.

The California high-speed train project would be one of the world's largest public works projects, with estimated costs over $30 billion. The concept of a single contract for the planning, design, construction, operation and maintenance of the entire 800-mile system is neither practical nor desirable – the project is simply too large to consider such an approach. In order to implement the high-speed train (HST) system, numerous contracts in varying sizes and dollar amounts should be awarded to complete system implementation through private sector contracts. Breaking the project tasks, where possible, into multiple contracts would promote competition within the construction and supply industry.

Assuming an institutional structure consisting of a modest public sector staff supported by with consulting contracts and the Authority's broad contracting capabilities, there are a variety of procurement strategies available to the Authority. Authority staff recommends utilizing the design/build, design/bid/build, design/build/operate and the design/build/operate and maintain procurement strategies where appropriate.

For all of the following procurement options, the Authority with the assistance of the project management contractor/s will develop detailed bid documents based on the preliminary engineering and performance criteria.

1) *Design/Build (DB)* – This approach integrates the design and construction functions into one contract. The Authority staff recommends DB for the large civil works construction related contracts. Either the project management contractor/s or other contractor(s) will prepare preliminary designs and requirements, based on the initial engineering and performance criteria.

   The DB method brings many benefits; it provides a single point of responsibility for final design and construction, it typically reduces the time for project completion, project costs are usually reduced due to lower design costs (as compared to the DBB method), the latest in construction methods are adopted early into the design process, it allows for "fast-track" construction (the ability to begin construction while the design of the project element continues), and DB can effectively harness competition among contractors and suppliers.

2) *Design/Bid/Build (DBB)* – The DBB method is the conventional method for building public works projects in the US. Preliminary designs are prepared by either the

project management contractor/s or other contractor/s. Based on the preliminary design and the performance criteria the Authority would contract for the development of final designs and bid documents. The completed final designs would be put out to bid for construction.

The DBB method would allow the Authority greater control because the designer is exclusively serving the Authority's interests, and it increases the involvement of smaller, local, and minority owned contractors; however it requires more oversight, coordination and administration from the Authority. The DBB method is not easily fast-tracked due to the need to conduct two procurement processes, and requires extensive coordination between the design and construction contractors.

3) *Design/Build/Operate (DBO) & Design/Build/Operate/Maintain (DBOM)* – Both of these methods are initially similar to the design/build option but continue for extended future time periods with the added functions of either operations or operations and maintenance. Acknowledging the fact that the Authority will not be entering into a single franchise contract for the implementation of the entire high-speed train system, there is the possibility of entering into a single contract for the systems (signaling, communications, track and electrification) and train technology for the entire project. The DBO or DBOM options for the systems and train technology may provide the best opportunity for the private sector financing, risk sharing, and clear accountability.

Authority staff recommends that the design/build procurement strategy be the preferred contracting mechanism for the major, high value construction contracts, and that the design/bid/build procurement method may be utilized for specific portions of the system or facilities, that due to particularly sensitive design aspects (environmental, aesthetics, and/or technological) may require extensive design iterations or options.

The procurement strategy for the systems and train technology should be decided later in the development of the program. Staff currently finds a single design/build/operate and maintain contract an attractive method, because it appears to be the best approach to enhance the integration of HST systems and to leverage public/private partnership opportunities. However, further discussions with potential technology providers and others, as well as additional analysis will be needed to determine if a DBOM for the systems and train technology is financially feasible and preferable.

If a single DBOM is not pursued, another approach would be to break major system and operating elements into separate contracts, which could contain one or more of the following: 1) track, 2) electrification, 3) signaling/communications and train technology, and 4) train operations and 5) maintenance of the various systems and

civil structures. In this approach, balance and coordination between the interests of the system operator (that the infrastructure require little maintenance, be highly reliable, and generate maximum revenue) and the builders (that it be low cost and quick to build), would be enhanced by a formal Joint Working Group of representatives of the several contractors and suppliers.

In either case the Authority staff recommends a single operator for the HST (where not sharing tracks with other services) that would be responsible for providing a variety of services (local, regional, express, premium, etc.). The Authority staff believes that a single operator would ensure accountability, reduce risk, maintain effective coordination and communication, and simplify Authority oversight.

IV. Technology Selection

The Authority's enabling legislation defines *high-speed rail* as "intercity passenger rail service that utilizes an alignment and technology that makes it capable of sustained speeds of 200 mph (320 kph) or greater". As part of its program EIR/EIS process, the Authority has identified steel-wheel-on-steel-rail trains capable of meeting the performance criteria summarized in Table 1 (see below) that would be able to share tracks at reduced speeds with other compatible services as the preferred HST technology. Nevertheless, most of the HST system would operate in a dedicated (exclusive track) configuration. All existing systems with this very high-speed capability use electric propulsion.

In developing the California HST, the Authority intends to take full advantage of the many years of research and development and practical application of HST service and utilize technology that has been proven in everyday regular revenue service over extended periods of time. The Authority would work with existing suppliers to modify off-the-shelf equipment for use in California to maximize the use of proven technology and designs, lower the cost of design and testing, ensure a faster delivery of trainsets, and put more of the workability risk on the supplier. This approach was successfully applied with HST systems in Spain and Korea and is now being carried out in Taiwan and the Netherlands.

Drawing upon earlier fact-finding and expert advice, the Authority staff recommends that the selection of manufacturer and type of high-speed train should be made as early as practical in the implementation process. The specifications of the vehicle are needed for final systems design and the manufacturer should participate in the oversight of the design and construction of the HST infrastructure. However, this critical decision must be made with great confidence and care.

Table 1
HST Performance Criteria

Category	Criteria
System Design Criteria	Electric propulsion system. Fully grade-separated guideway. Fully access-controlled guideway with intrusion monitoring systems. Track geometry must maintain passenger comfort criteria (smoothness of ride, lateral acceleration less than 0.1 g).
System Capabilities	All-weather/all-season operation. Capable of sustained vertical gradient of 3.5% without considerable degradation in performance. Capable of operating parcel and special freight service as a secondary use. Capable of safe, comfortable, and efficient operation at speeds over 200 mph. Capable of maintaining operations at 3-minute headways. Capable of traveling from San Francisco to Los Angeles in approximately 2.5 hrs. Equipped with high-capacity and redundant communications systems capable of supporting fully automatic train control.
System Capacity	Fully dual track mainline with off-line station stopping tracks. Capable of accommodating a wide range of passenger demand (up to 26,000 passengers per hour per direction). Capable of accommodating normal maintenance activities without disruption to daily operations.
Level of Service	Capable of accommodating a wide range of service types (express, semi-express/limited stop, and local).

It is vital that the Authority has the appropriate staff and program management contractor/s and that work is well underway in order to develop the appropriate bid requirements and oversee the selection process. In the Project Schedule of this document, the decision on technology is anticipated to be made 2-3 years after significant financing was secured for HST implementation. Project-specific environmental studies, preliminary engineering, and right-of-way preservation would all begin and in some cases may be nearing completion prior to the selection of the HST technology.

The FRA would need to develop and approve a special "*Rule of Particular Applicability*" (Rule) for HST operations in California since FRA regulations for passenger train operations exceeding 150 mph are not comprehensive. Obtaining a rule will be a complex undertaking for California. European and Asian HST systems differ markedly from current US rail practices and the FRA application of safety requirements for vehicles would preclude lighter weight, non-compliant trains (such as off-the-shelf European and Asian HST equipment) from sharing tracks with conventional services, and are not likely to be waived. FRA would not begin the formal rule making process with California until substantial funding is available for construction of the HST system and preferably after the HST technology has been selected.

The Authority staff recommends engaging the FRA and the field of potential HST manufacturers to investigate how existing HST vehicles could be modified for use in California and to further the FRA's understanding and potential acceptance of safety approaches that have been applied successfully in other countries. Potential HST manufacturers would be selected based upon their existing ability to produce very high-speed trains and would then be pre-qualified to compete for future HST contracts in California. Funding would be provided to accepted manufacturers to undertake these efforts. This work could take a couple of years and, if possible, would begin as soon as possible. The Authority staff believes that this work would be very valuable to the HST planning effort. It would enable all parties (the system suppliers, the Authority, and the FRA) to know more in regards to the manufacturers abilities to meet existing FRA standards and what (if any) changes to or waivers from FRA regulations that could be needed in order to operate the safest, most reliable HST service in California. The Authority staff believes this effort would reduce the time needed to complete the rulemaking process and would improve the price competition and quality of bids as well as improving the Authority's ability to evaluate those bids.

V. Phasing and Staging Methodologies

The California High-Speed Rail proposal is an 800-mile-long system, having up to twenty-eight stations, and is estimated to cost over $30 billion. The sheer scale of this proposal makes it impractical to construct and initiate operations of the entire project all at once. Even if sufficient funds were secured, constructing a project this large, all at once, would cause too great a strain on the California economy through excessive demand for construction materials and labor. Like other large transportation projects, the high-speed rail system can be divided into smaller segments that can be operated before the full system is complete.

The Authority staff recommends that decisions on precise staging of segment construction and opening for service should be deferred until the completion of new

ridership and revenue forecasts, currently underway, and the selection of a preferred routing for the northern mountain crossing between the Bay Area and the Central Valley, and when the amount of state funds available is known.

Existing ridership and revenue forecasts are about 5 years old, and do not include enough comparative analysis of various options for initial operating segments. Moreover, the amount of capital available to implement the system and any limitations to the use of the funds should be known prior to making commitments regarding the phasing of construction. The amount of capital available will greatly influence the range of options for initial operating segments.

Considerations governing what constitute workable segments, and the order in which they are phased should include:

A. The availability of capital to construct the segment(s) and procure train systems.

B. Ridership and revenue potential and the ability of the segment(s) to be operated without a state subsidy.

C. The ability to service trainsets at appropriate maintenance facilities.

D. The concurrent construction and initiation of service in regions of both Northern and Southern California.

E. The avoidance of labor or material scarcity-related cost increases.

The High-Speed Passenger Train Bond Act (SB 1865/SB1169) identifies that the first portion of the high-speed train system to be funded will be San Francisco to Los Angeles. Even within that portion, there may be regional segments that can be opened before construction is complete on the entire North-South line.

VI. Financing

The California high-speed rail project is one of the world's largest public works projects, with estimated costs over $30 billion. Based on the experience of other countries, a "carefully planned" high-speed train system is a smart investment that is projected to return a benefit of at least two dollars for every public dollar invested. More importantly, once built, the service provided by the system, is expected to yield annual operating surpluses in excess of $300 million ($1999/Business Plan 2000).

Certain high-speed train lines in Europe and Japan have generated sufficient revenues to pay the construction and operation of those systems. However, in California a high-speed train must compete with automobiles and airplanes, which have enjoyed

decades of public subsidy and are well established. Until the high-speed rail system has proven to operate at an operating surplus, public resources will be needed for capital and deployment costs.

In 2000 the Authority published the Business Plan, which presented two funding approaches. The first approach was the full-funding scenario, which assumes that the entire system is constructed simultaneously. The second approach was a phased-funding approach that focuses on securing resources required to complete discrete sequential phases of the project as expeditiously as possible.

The Authority concluded that the phased-funding approach is the most prudent and business-like approach and will ultimately be of better value to the state's taxpayers. The phased-funding approach calls for development of a detailed financing plan, which would include state and federal funding sources as well as exercising the Authority's broad contracting powers to secure private sector funds.

Since the preparation of the 2000 Business Plan there have been some developments in potential funding sources for the high-speed train system.

In 2002 *The Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century* (SB 1856 - Costa) was signed into law by former Governor Davis. SB 1856 provides high-speed rail funds through the issuance and sale of General Obligation (GO) bonds. SB 1856 required voter approval in the November 2004 general election and provided for the issuance of $9.95 billion of bonds for rail development in California. Nine billion is authorized for high-speed rail and $950 million is authorized for capital improvements to intercity and commuter rail lines and urban rail systems. SB1856 stated that no bonds maybe issued prior to January 1, 2006.

Due to the State's fiscal condition in 2004, SB 1856 was amended by SB 1169 (Murray) and signed by Governor Schwarzenegger. SB 1169 provides for the submission of the S*afe, Reliable High-Speed Passenger Train Bond Act for the 21st Century* to the voters for approval at the November 7, 2006, general election. SB1169 also provides that bonds for the high-speed train system would not be issued earlier than January 1, 2008.

The potential availability of GO bonds coupled with the refinement of the high-speed rail program, through the environmental process, necessitates the development of an updated financing plan. A key element of the revised financing plan is an updated ridership/revenue study.

The updating of the ridership/revenue forecast is currently underway and is expected to be completed in August 2006. The revised financing plan will be developed concurrently with and based on the new ridership/revenue forecasts and will take into consideration the availability of GO bonds as a potential funding source.

Overview and discussion of prototype HSR development schedule

The time it takes to develop the CA HSR from the current planning stage to operation of an initial segment will depend on the specific route segment chosen. The schedule on the next page illustrates the sequencing of major tasks, regardless of specific segment, and assumes that the Authority chooses a specific supplier of HS technology as an early priority. Depending on the complexity of the segment, the time from availability of major funding to the start of service ranges from eight to eleven years. The color of each line corresponds to one of four categories of parties in the implementation – **Authority** staff and direct consultants in green, design and construction **contractors** in brown, **train system suppliers** in blue, and the **operator** in red. Orange circles indicate **intermediate milestones** and green circles indicate **completion** points.

Organization and agreements

Covers the establishment of the Authority's organization, selection of project management and other consultants, reaching agreement with significant entities such as railroads and existing rail operators, and developing guidelines and agreements for station development. Agreements for station area development plans would be sought with the localities to maximize infill transit-oriented joint-development of station areas. Preliminary agreements with co-located railroads and rail operators need to be reached before project-specific EIS/R work can progress, with final agreements after the EIS/R work and FRA rule making.

Segment planning, EIS/R & permits

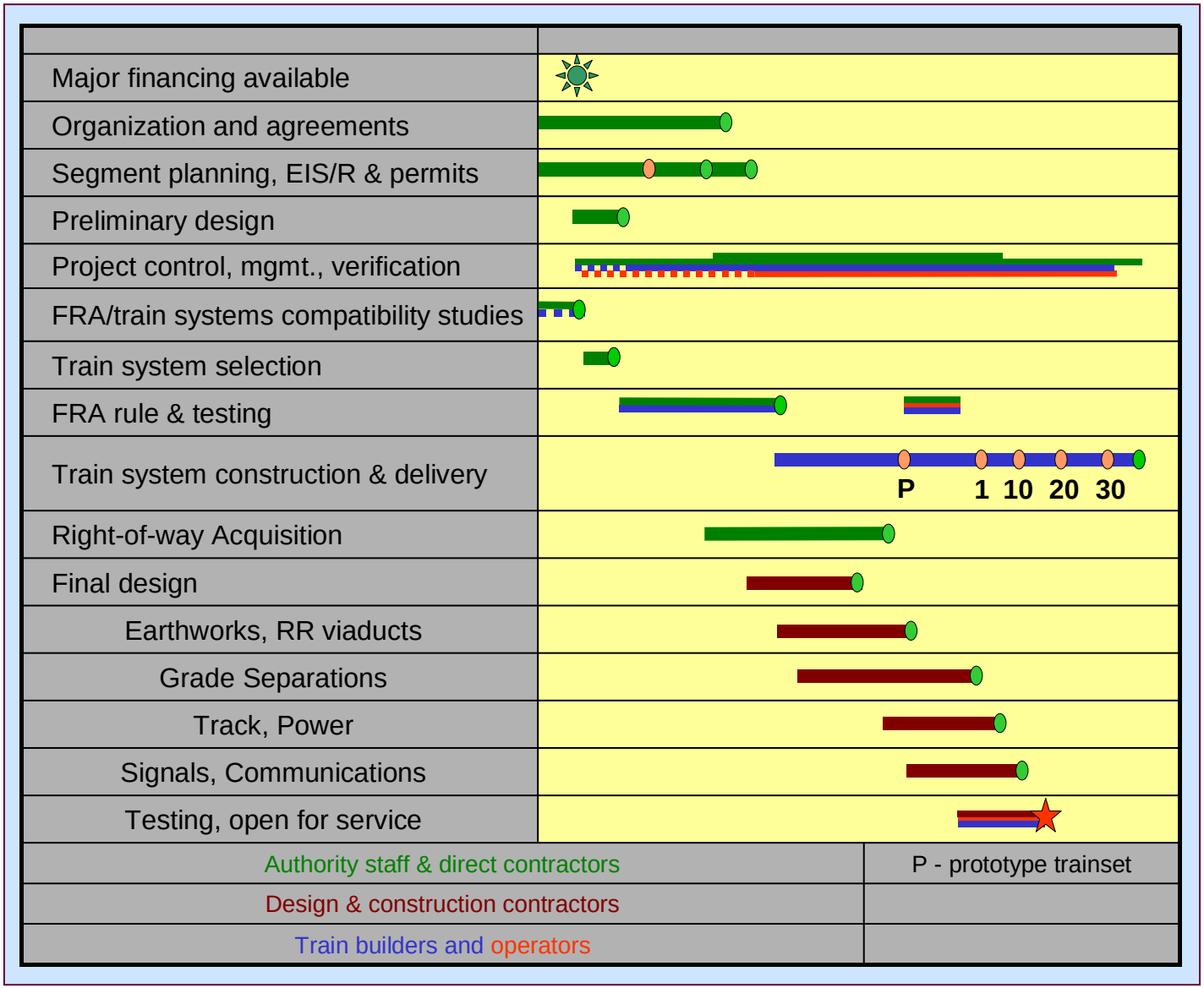
Project-specific environmental review, supported by preliminary design, will require one to two years to reach a draft EIS/R, followed by a final EIS/R and agency sign-off 6 to 12 months later. Major permits from Federal and State agencies follow 6 to 12 months after that.

Preliminary design

Ranging from 15 to 30% of the total design required for the segment, preliminary design is required to be done to support the EIR/S, permitting, agreement, and right-of-way acquisition processes.

Project control, management, verification

The Authority must strive to systematically control schedules, costs, and system configuration as preliminary design and the EIS/R work are being undertaken. The interests of the potential train system suppliers and future operators need to be incorporated into the project at this stage, through consultation with current companies and through advisory missions. This is shown in the dotted lines. In final design and construction stage, the project management responsibilities and volumes of work grow along with quality control and construction inspection work. Train system suppliers and future operators would have a formal role at this point. Trainset acceptance, warranty and project wrap-up extend beyond the start of service.


Major financing available
Organization and agreements
Segment planning, EIS/R & permits
Preliminary design
Project control, mgmt., verification
FRA/train systems compatibility studies
Train system selection
FRA rule & testing
Train system construction & delivery
P
1
10
20
30
Right-of-way Acquisition
Final design
Earthworks, RR viaducts
Grade Separations
Track, Power
Signals, Communications
Testing, open for service
Authority staff & direct contractors
Design & construction contractors
Train builders and operators
P - prototype trainset

FRA/Train Systems Compatibility Studies

The Authority, FRA and qualified HST manufacturers will investigate how the existing HST vehicles could be modified for use in California

Train system selection

An early selection of train system suppliers is assumed in this schedule, allowing the setting of final design criteria, finalizing preliminary design issues, and allowing for the initiation of Federal Railroad Administration rule making.

Federal Railroad Administration rule and testing

Rule making may require 2-3 years. The Authority and selected train systems supplier would discuss the rule with the FRA, and would consult with other affected rail operators. If the rule could be concluded more rapidly, it is likely that the schedule critical path would not pass through this task, but rather through the construction work. Testing of a prototype trainset to ensure compliance with FRA and other requirements is assumed to take place during a 12-month period.

Trainset construction and delivery

This task depends on the completion of FRA rule development. Design and construction of the prototype is assumed to require 30 months (shown by "P" on the schedule). After testing of the prototype, six months are assumed before the delivery of the first production train equipment, which are then delivered at the rate of one per month. Operations can begin when enough trainsets are available to start a service, here assumed to be approximately 15, but the critical path may actually lie in the construction and installation work. The schedule shows the complete acquisition of all required trainsets ending two years after the start of service.

Right–of-way acquisition

This task begins after the substantive completion of the environmental work, and is expected to require up to 42 months. In instances where the right-of-way is already assembled, as in the shared segments and LAUS, this activity will be subsumed into the agreement negotiations, potentially saving a year of time.

Final design and construction/installation

The schedule assumes that the majority of the work is performed as design/build contracts, in which substantial overlap of work will be possible through staging of sub-segments by the contractors. Design completion will require several years, and construction of long tunnels and grade separations will take the longest amount of time and will drive the construction schedule. Depending on the segment, civil works design and construction will require 30 to 60 months. Installation of track, power systems, signalling, and other systems are estimated to require more than one year for the longer segments, but because work can start sequentially, can be completed in only one additional year after the civil works.

Testing, training, and service opening

This task can begin after the first segments are completed, with substantial overlap with installation of systems. Service is assumed to begin six months after completing the final sub-segment.

CALIFORNIA HIGH SPEED RAIL AUTHORITY BOARD

IMPLEMENTATION PLAN DECISIONS

September 22, 2004
Los Angeles, California

Today's Presentation

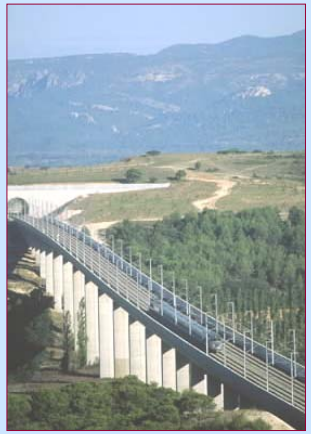
- **Implementation Plan Work Overview**
- **Critical Implementation Issues**
  - **Part 1 of 2**

2

Developing the Implementation Plan

Implementation Plan Outline

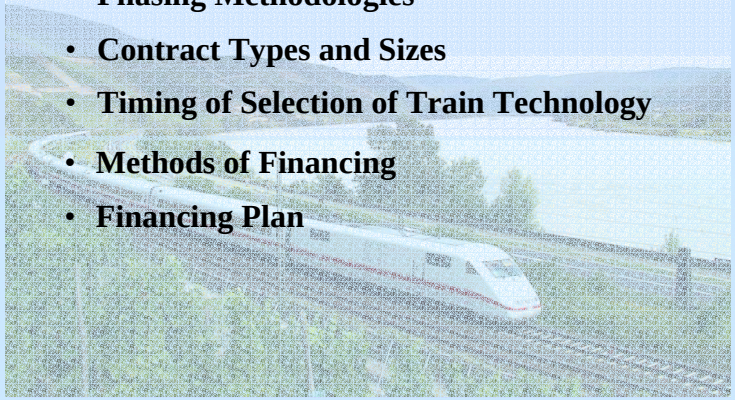
- High-speed rail line description & benefits
- Finalizing alignment & stations
- Regulatory approvals: Federal,State, & local



- Railroad agreements
- Train systems choices
- Financial needs
- Schedule to open major segments
- Managing design & construction, train systems procurement, & operations

Key Authority Decisions

- Authority Structure
- Phasing Methodologies
- Contract Types and Sizes
- Timing of Selection of Train Technology
- Methods of Financing
- Financing Plan



5

Adapting HSR to US Requirements

- Federal Railroad Administration (FRA) must issue special rule for trains to operate 150 mph +
- European & Asian HS trains and control systems differ markedly from existing US practice
- FRA rule will also cover other aspects of trains, stations, infrastructure, and operations
- In late 90's FRA defined many conditions for use of TGV technology in the US
  - crash avoidance and energy absorption
  - no public at-grade road crossings
  - doors on station platforms like airport people mover

6

Adapting HSR to U.S. Requirements

- Other Federal and State regulations will also require modification of overseas HSR systems
  - Handicapped access (ADA)
  - Safety
  - Material flammability
  - Emergency exits
  - Window glass
- Marketing considerations also will suggest modification of amenities such as seating
- Multi-year process to agree on train design and controls; infrastructure may be quicker
- Prototype train(s) will need to be tested for FRA with actual infrastructure and systems
- California will also need to address operation in mixed traffic segments

Potential sharing with other rail operators

Shared use issues

- All trains on HS tracks with 150+ mph operation most likely subject to FRA's particular rule
- If all trains under 125 mph, published FRA requirements will apply
- But, non-compliant trainsets have operated with FRA waivers at 79+ mph since 1970's
- Commuter agencies & other operators will need
  - acceptable FRA rule conditions
  - agreement on operations safety, liability, cost sharing

9

Adapting HSR Train Systems - Options

- CHSRA develops detailed specifications to meet requirements
  - Less service-proven content increases risk of cost and completion schedule overruns
  - State & consultants primarily responsible for workability
  - Higher design and testing cost
- CHSRA works with existing suppliers to modify off-the-shelf equipment
  - Lower risks from maximizing service-proven content
  - Supplier assumes more workability risk
  - Lower cost of design and testing
  - Faster delivery

10

HSR Train Systems - When to Designate?

- Should the State choose the core system (train, signals, catenary) supplier(s):
  - Early, before engaging FRA in rule making on 150+ mph operations and shared use?
  - Later, having agreed with FRA on what will be needed for vehicles, signals, catenary, stations, other infrastructure, and operations?

11

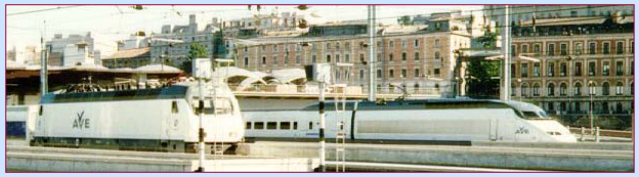
Examples of HSR train system chosen early

- Typical of both pioneering systems & expansions of system already in place
  - HS Pioneers
    - Shinkansen Japan
    - TGV France
    - ICE Germany
    - KTGV Korea
  - HS extensions
    - UK Chunnel Link
    - Belgium
    - Netherlands

12

Examples of HST train system chosen later

- **Typical of new systems implementing proven technology with competition**
  - **AVE Spain (TGV, ICE, Siemens & Talgo): multiple procurements**
  - **Taiwan (TGV/ICE & ultimately Shinkansen): single procurement of core system**
  - **Amtrak Northeast Corridor (Bombardier): multiple procurements for trains, power, signals**
- **Several vehicles & interfaces possible; defined standards imposed on all bidders**



13

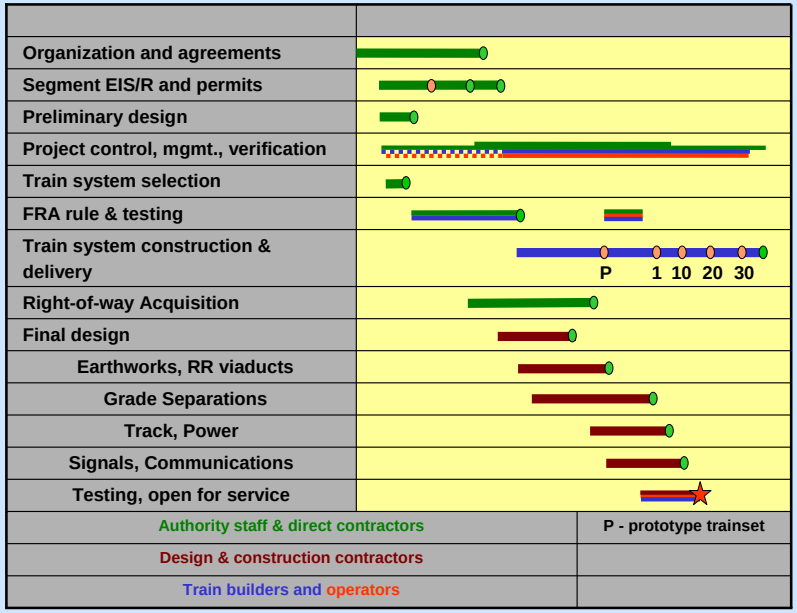
Pros & cons of early train system choice

- **Known train system allows infrastructure to be designed with fewer changes**
- **FRA rule making could start early**
- **Could shorten & simplify FRA work**
- **Infrastructure preliminary design & systems' specification costs could be lower**

- **Could result in train cost increases once FRA finalizes the requirements**
- **May limit future types of equipment**

14

Construction sequencing - Early selection



Pros and cons of later train system choice

- Could allow development of performance based standards to improve price competitivity
- Equipment & system suppliers could know more of FRA requirements before making bids
- Can remain open to future equipment types
- Details of system not known before final design, creating more design changes
- Infrastructure preliminary design & systems' specifications cost could be higher
- Work with FRA will likely require more iterations and could take longer
- CHSRA would develop & manage a vehicle advisory group for FRA rule making

California-specific factors to consider

- **HS train choice affects less than 3% of infrastructure cost (high-speed tunnels & viaducts, platform height, etc.)**
- **Trains around 10% of the cost**
- **Preliminary design and bid specifications less than 1% of cost**
- **No major technological leaps**

17

18

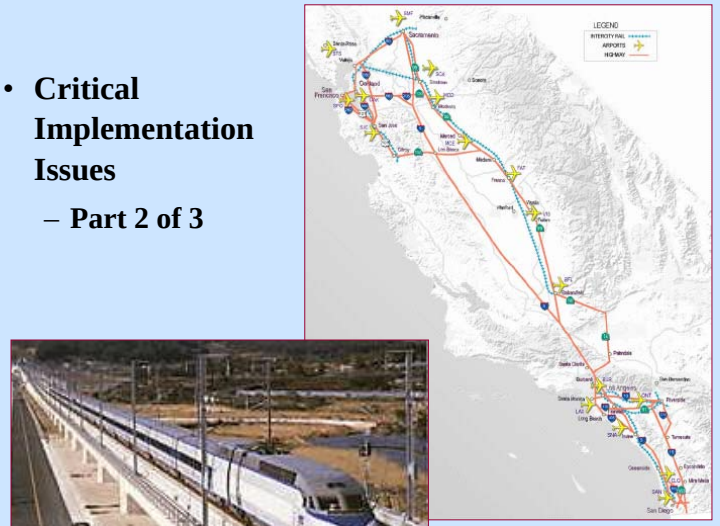
CALIFORNIA HIGH SPEED RAIL AUTHORITY BOARD

IMPLEMENTATION PLAN DECISIONS

November 10, 2004
Sacramento, California

Today's Presentation

- **Critical Implementation Issues**
  - **Part 2 of 3**



2

Key Authority Decisions

- Timing of Selection of Train Technology
- Phasing Methodology
- Contract Types and Sizes
- Authority Structure
- Operations and Financing
- Financing Plan

3

Phasing methodology

"Phasing" is order of construction and opening of segments

Each segment typically will have several stages for civil work and train systems

- **Each segment must have sufficient capital funding to construct**
- **If a segment is to be operated, it must have**
  - **coverage of operating cost, either**
    - **from fares, as projected for full system**
    - **from interested parties if partial opening**
  - **access to maintenance for trainsets**

4

Examples of phasing in other systems

- **Western Shinkansen**

  - 1964: Tokyo-Osaka - 320 miles
  - 1972: Osaka-Okayama - 102 miles
  - 1975: Okayama-Hakata - 242 miles

- **Southeast TGV**
  - 1981: 188 miles north of Lyon
  - 1983: 72 miles farther north
  - 1994: 60 miles to Valence
  - 1994: 35 miles to TGV North
  - 2001: 144 miles Nimes/Marseille

5

Decisions & Considerations for CA HSR

- Should entire line be built as soon as possible?
- Should operable segment(s) be opened first?
- What is the long-term plan for the entire system?
  - Equitable geographical distribution of construction & openings
  - Large contract effect on labor market and materials costs
  - Availability of capital and operating funding

6

Major Types of Construction Contract

Traditional Design - Bid - Build

- 100% design by own staff or contractor
- Bid documents prepared by staff/contractor
- Design put up for bids from constructors
- Constructors build the project as designed

Design - Build

- Preliminary design (20-30%) by own staff or contractor
- Bid documents prepared by staff/contractor
- Design & construction put up for bid from design/constructor groups
- Groups finalize design and build the project

7

Traditional Design-Bid-Build

- State retains direct control over design and interfaces between civil works & train systems
- Easier to split construction into smaller packages than Design-Build, which allows local builders to compete independently
- Construction packages also can be large to create economies of scale
- Designers cannot take advantage of strength or specialized skills of specific builders
- Separate responsibilities for design and construction increases areas of dispute
- Longer overall schedule compared to Design-Build

8

Design-Build

- Design can be tailored to match builder strengths, speed up schedule, and lower cost
- State can evaluate combination of design approach, construction price, and schedule
- Single entity for design and construction reduces areas of potential dispute with State
- State must monitor design more thoroughly to ensure quality & adherence to prelim design
- State must do more to ensure interfaces between groups - tends to increase contract size
- Smaller builders must join or form consortia in order to compete

9

Design - Build - Operate - Maintain

Extension of Design - Build approach

- Definition of operations and reliability targets added to preliminary design by state
- Bid packages include fixed term services from design/constructor/operator/supplier groups
- Train operations do not have to be included
- Maintenance of items can be assigned to different builder and supply groups
- Designers encouraged to weigh future maintenance costs as well as construction cost
- Similar need for more State involvement to monitor design, ensure interfaces between groups
- State must also monitor actual performance and have suitably effective remedies such as bonding

10

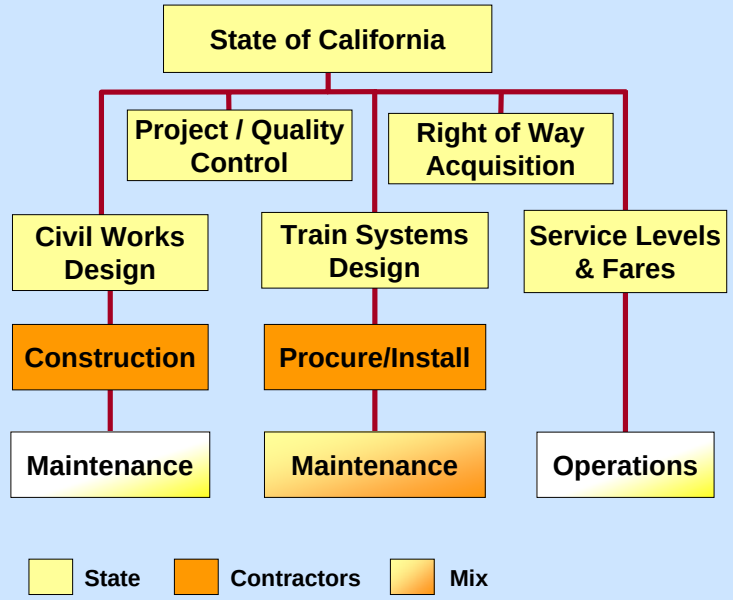
Authority Structures for HSR

Several implementation structures have been used

- **State does most of development and operation with its own railroad or personnel**
- **State grants single multi-decade franchise for construction and operation**
- **State issues several contracts &/or franchises**
  - **By logically connected pieces**
  - **By stage of project**
  - **By geographical segment**

11

State High-Speed Railroad Approach



12

State High-Speed Railroad Examples

France (SNCF) various TGV lines,

Germany (DB) various ICE lines,

Japan (JNR & successors) various Shinkansen lines

Korea

Spain

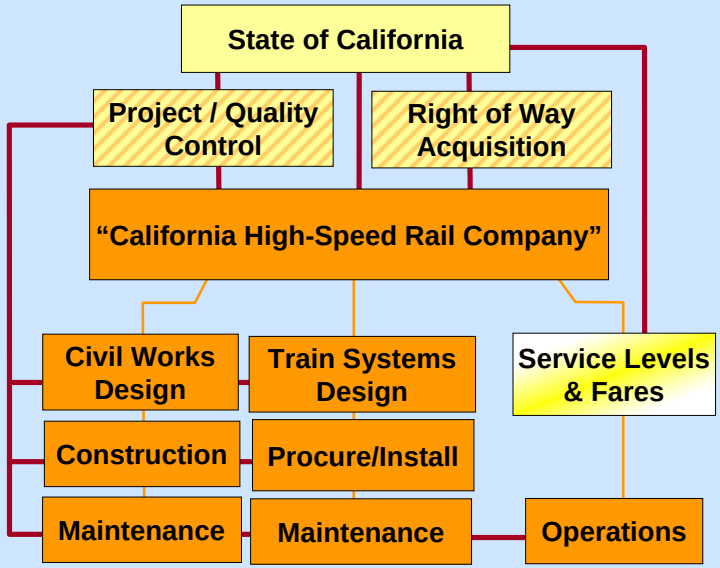
13

California State HS Railroad Considerations

- **No State High-Speed Railroad in place**
- **Current expertise in government would have to be expanded & assigned long-term to HSR**
  - **High-speed railroad planning**
  - **Construction management**
  - **Quality control**
- **Railroad engineering, operations, maintenance personnel would have be recruited**
- **Government employee count would increase**
  - **several hundred in design phase**
  - **several hundred for operations/maintenance**

14

Single HSR franchisee structure



15

Where Single-Franchisee Has Been Used

HSR

- **Taiwan (Design, Build, Operate, Maintain, Transfer)**
- **Channel Tunnel (D,B,O,M)**
- **UK Channel Tunnel Link (hybrid with some State Railway legacy)**

16

Considerations with Single-Franchisee

Private sector potentially more flexible & innovative than government

Government still has responsibility to ensure

- **completion**
- **timeliness, and**
- **quality (220 mph speed, maintainability)**

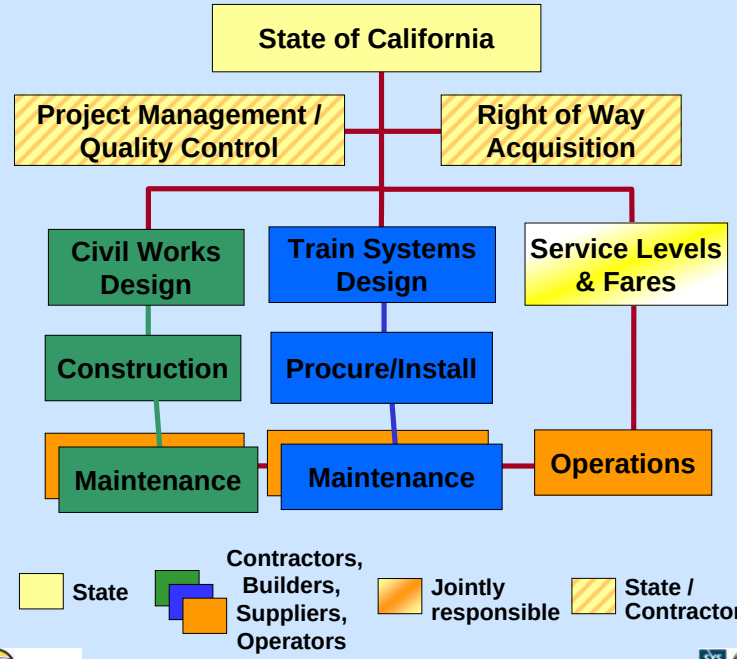
Penalties & bonding typical, plus ability to revoke franchise and re-award to other party

Project size and length greater than most franchisee projects

Project cost larger than realistic maximum bondable amount of several billion dollars

17

Multiple contract structure



18

An Example of Multiple Contract

HSL Zuid (HS Line South, Netherlands)

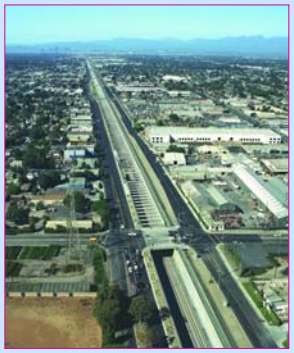
- New high-speed line and parallel highways
  - 60 miles, $ 3 billion, 6 design-build contracts
- Connections to existing rail system
  - $240 million, 2 design-build contracts
- HS track, signals, catenary, power, sound barriers
  - 60 miles, 1 design-build-maintain contract
- Trainsets, plus their operation & maintenance
  - 1 contract to railroad / airline consortium

19

Another Example of Multiple Contract

Alameda Corridor (Ports of LA & Long Beach to transcontinental freight lines)

- 20 miles, $2.4 billion, 25 construction contracts
- Contractor-managed project for Authority
- Largest contract $754 million design-build
  - 10 mile trench, all 20 miles of rail & signalling
- Next largest $100 million Henry Ford Ave. grade separation
- $47 million Redondo Jct. split into numerous smaller projects



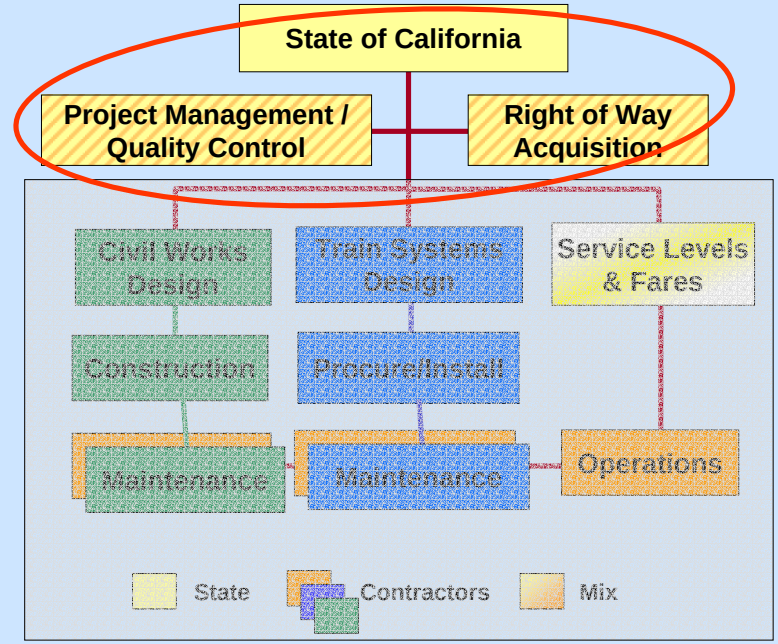
20

Considerations with Multiple Contracts

- Private sector flexibility can be harnessed where most helpful
- Government maintains strong control over project organization, contracts, timeliness, and concept
- Allows spreading of risk among many parties, and reduces bonding difficulties
- Requires strong Authority ability to manage project interfaces, contracts, design and construction quality control, schedule

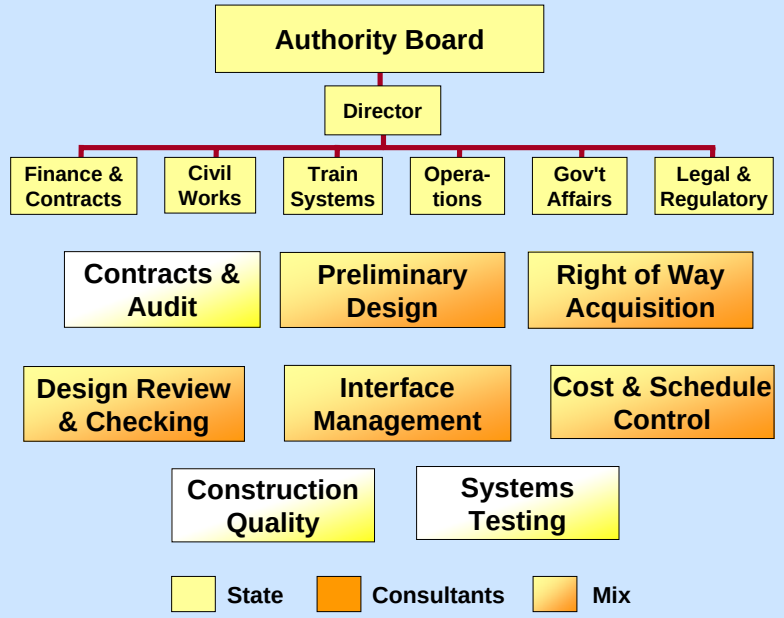
21

Authority Project Management Structure



22

Authority Project Management Functions



23

Project management structure considerations

Core Authority staff almost always includes

- **Project direction, financial planning, legislative and local liaison, legal affairs, engineering/construction oversight, operations planning**
- **On the order of 25-50 persons**

The bulk of production and control work can be

- **either staff hired by the authority (Korea, France, and other "railroad approach" projects have taken this route)**
- **or consultants mixed into the structure (as done in Taiwan, Alameda Corridor, HS south)**
- **total personnel need on the order of several hundred persons at the peak**

24

Considerations for Project Management staffing

- Overall project construction of more than a decade consistent with state employee staffing for core team
- However many activities are of shorter duration, (e.g. right-of-way acquisition) and lend themselves to shorter term consultant staffing
- Consultant cost generally higher than equivalent state staffing in short term, but long term pension and retention costs are avoided
- Consultant overhead cost (1-2 times the labor cost) can be reduced by negotiating project-specific rates because of multi-year schedule

25

26

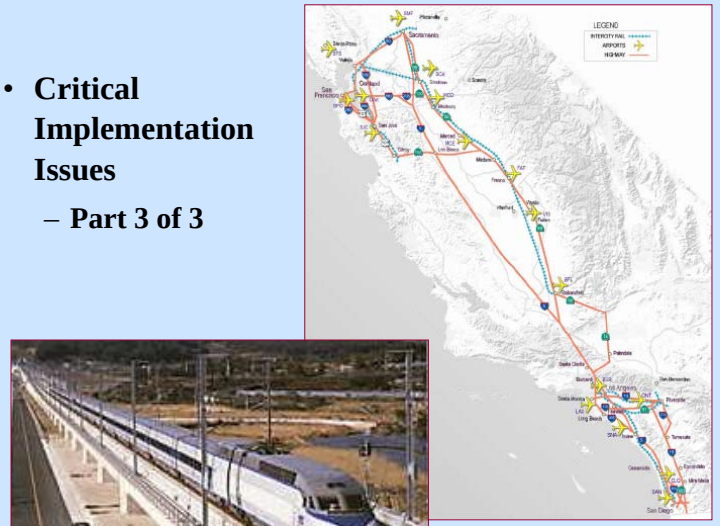
CALIFORNIA HIGH SPEED RAIL AUTHORITY BOARD

IMPLEMENTATION PLAN DECISIONS

December 15, 2004
Los Angeles, California

Today's Presentation

- **Critical Implementation Issues**
  - **Part 3 of 3**



Key Authority Decisions

- Timing of Selection of Train Technology
- Phasing Methodology
- Contract Types and Sizes
- Authority Structure
- Operations Organization
- Financing Plan Issues

3

Context for HS Operations Organizations

Many existing examples of organization

Evolved from local geography, past history, and government structures and goals

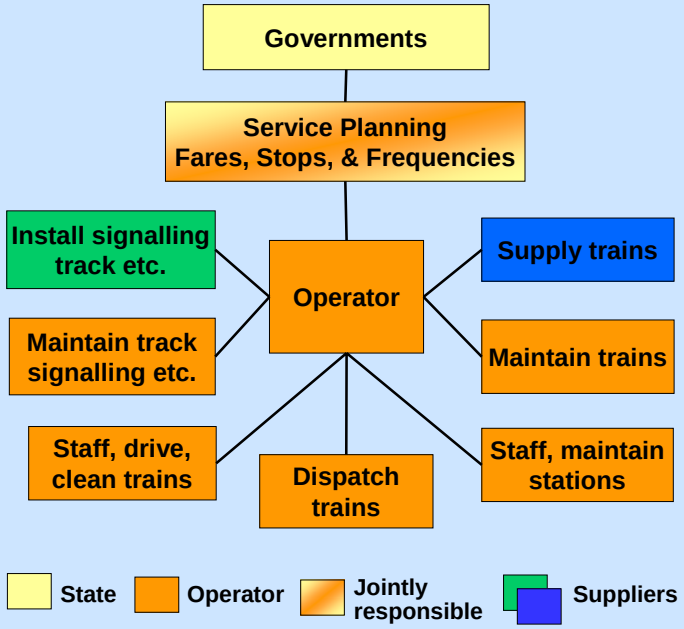
Recent overseas initiatives seeking to re-invent large state-owned railways

California can learn from overseas to create a *de novo* HSR structure that builds in:

- **economies of scale and coordination benefits typical of rail operation**
- **management accountability and workforce flexibility over multiple decades**
- **ability to innovate as travel markets, tastes, and competitive conditions change**

4

Traditional Operator's Universe



5

Traditional Operations Organization

One vertically-integrated organization covering all commuter, regional, & intercity services

- planning service levels, fares, times
- driving trains
- dispatching trains
- collecting tickets and serving food & drink
- cleaning, maintaining trains
- staffing cleaning stations
- maintaining track, signals, catenary etc.

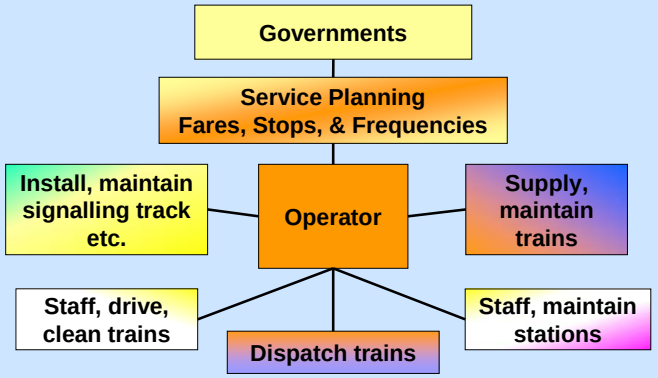
6

Traditional Organization Pros & Con

- Strong coordination of disparate activities needed to bring together quality service
- Economies of scale and uniform quality for widely dispersed services
- If not bureaucratic, easy to reallocate resources to respond to or compensate for problem areas
- If competition limited, organization may not respond to new markets
- Large size & institutional longevity tends to create bureaucracy that resists innovation
- More difficult to tailor service to local conditions

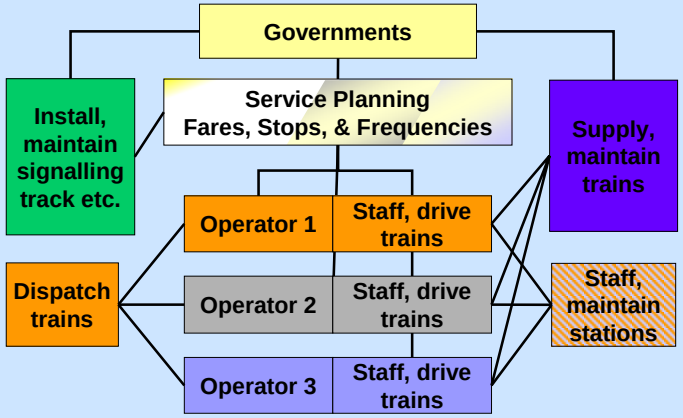
Variants - Subcontracting operations

- Common organization: Taiwan HSR, Metrolink, Caltrain, TGV, Shinkansen
- Fixed term contracts allow periodic revisiting of allocation of work in-house and outside as needed
- But, operator change is major upheaval



Variants - Multiple operators

- **Amtrak NEC, Sweden, Great Britain, Germany, European Union directive, with operators generally arranging for trains**
- **In CA, smaller train order might favor separate equipment contractor; operators would lease**



9

Multiple Operator Advantages

- **More competition and possibly more localized/specialized market service**
- **Allows clearer understanding of cross-subsidization - express trains generally support regional & commuter services**
- **Participation easier by wider range of operators, including air service companies**
- **Allows separation of infrastructure and train maintenance contracts from operators**
- **Changes of operator easier because less of organization affected**

10

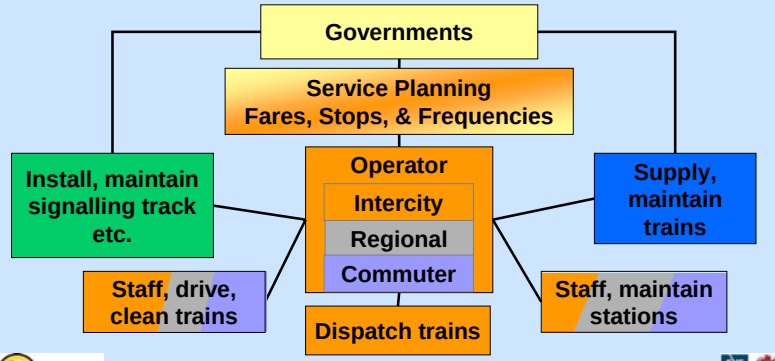
Multiple Operator Drawbacks

- More complex management of contracts and interfaces for governments
- More complex for operators and other contractors - more potential for finger-pointing
- Multiple points of accountability rather than single
- Needs contractual redistribution of funds by government to achieve ridership and smaller city service levels assumed
- Initially high uncertainty for potential operators since experience with each market does not exist

11

Single operator, multiple services

- Single operator establishes operating divisions while dealing with train suppliers and track companies (RENFE)
- Medium term contract/franchise would require financial reporting by segment
- Information could help determine improvements to franchise arrangements in second bid



12

CAHSR Financial Fundamentals -1

(figures in millions; year 1999$$)

	Year	Passen-gers	Revenue	Operating Cost	Net Operating Cash Flow
CAHSR (Projected)	2020	42 - 68	$ 976 - $1,821	$ 601 - $ 900	$ 375 - $ 921

- Passenger and revenue forecasts from 2000 Business Plan that will be updated by new study
- Includes revenue from
  - HS intercity passengers ($888 - $1,733)
  - Long distance commuter passengers ($69)
  - Small package freight ($16)
  - Station concessions, leases ($3)
- Costs from 2000 Business Plan with own estimate of cost for higher end of intercity revenue forecasts

13

CAHSR & Overseas Comparisons -1

(figures in millions)

	Year	Passen-gers	Revenue	Operating Cost	Net Operating Cash Flow
CAHSR (Projected, 1999$$)	2020	42 - 68	$ 976 - $1,821	$ 601 - $ 900	$ 375 - $ 921
Tokaido Shinkansen *	1990	191	$9,500	$3,500	$6,000
Tohoku/Joetsu Shinkansen *	1992	76	$3,570	n.a.	n.a.
TGV Paris-Lyon *	1991	19	$ 980	$ 390	$ 590
TGV Atlantique *	1991	18	$ 715	$ 315	$ 400
THSRC (Projected, 1998$$)	2009	68	$1,880	$ 640	$1,240

** Uninflated $$ of year shown & then-prevailing exchange rate*

14

CAHSR Financial Fundamentals - 2

(figures in millions; year 1999$$)

	Year	Miles	Capital Cost	Cost per Mile	Net Cash Flow / Capital
CAHSR (Projected)	2003	703	$33,000 - 37,000	$ 47-53	1.1% - 2.5%

- Capital costs from 2003 EIR/S work
- Net operating cash flow could fund only 1/4 of capital cost at high end of forecast with government tax-exempt rates and low risk levels

CAHSR Overseas Comparisons- 2

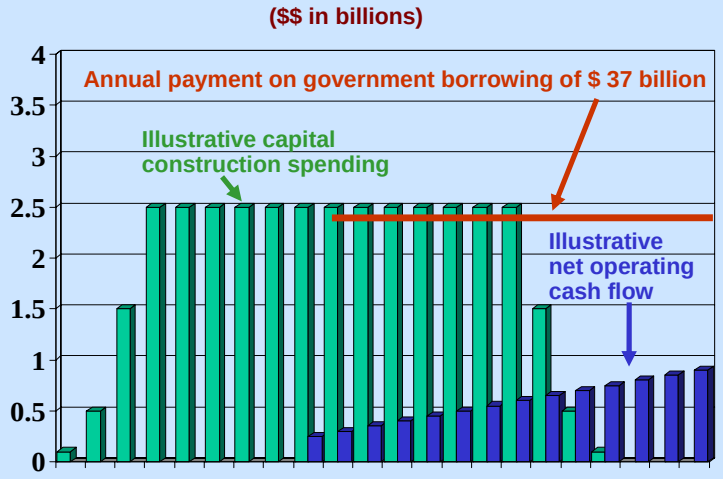
($$ in millions)

	Year	Miles	Capital Cost	Cost per Mile	Net Cash Flow / Capital
CAHSR (Projected, 2003$$)	2003	703	$33,000 - 37,000	$ 47-53	1.1% - 2.5%
Tokaido Shinkansen *	1959 - '64	320	$ 640	$2	937.5%
Tohoku/Joetsu Shinkansen *	1971- '91	460	$ 36,000	$78	n.a.
TGV Paris - Lyon *	1975 - '83	250†	$ 2,700	$ 11	21.9%
TGV Atlantique *	1985 - '90	170	$4,700	$28	8.5%
THSRC (Projected, current $$)	2001- '05	210	$15,000 - $19,000	$71-90	6.5% - 8.3%

** Uninflated $$ of year shown & then-prevailing exchange rate*

† Not including 23 miles of conventional line entering Paris & Lyons

CAHSR Capital and Net Cash Flow



- Capital required before net operating cash flow is generated
- Net operating cash flow most useful to help fund later construction and procurement

17

CA SB 1856/1169 funding potential

- Authorizes general obligation bonds
  - $9 billion for HS project
  - $190 million for Caltrans rail program
  - $760 million for other rail projects
- Voter referendum scheduled November 2006
- Bonds would not be issued before January 2008
- Bridge loan financing allowed for earlier costs
- Requires bond funds spent on stations and track construction be equally matched by other funds (Federal, local, other sources)

18

Potential Federal HS funding

- Current program in Federal Railroad Administration not nearly enough for CAHSR
- Federal funds for highway/transit may not be used for intercity rail projects
- Federal funds normally require significant state match (30-50% of total cost)
- Various initiatives in 2005 Congress would potentially fund new large projects
  - Rail-specific bills
  - Transportation re-authorization bills (SAFETEA, TEA-LU)
- California needs to aggressively pursue strategy for favorable language and funding

19

20